

**REMARKS:**

In accordance with the foregoing, claims 1, 2, 12 and 13 have been amended herein. Claims 5 and 7 remain cancelled. Thus, claims 1-4, 6 and 8-13 are pending and under consideration. No new matter is added. The outstanding rejections are traversed below.

**REJECTION UNDER 35 U.S.C. § 102(b):**

Claims 1, 4, 8, 9, and 12 are rejected under 35 U.S.C. § 102(b) as being anticipated by A Statistical Approach to Multilingual Phonetic Transcription (Besling).

Besling matches letters and sequences of phonemes using an alignment between graphemic and the phonetic representations (see, page 368, last paragraph). In Besling, the alignment is done by dynamic processing where the phonemes are allocated to the graphemes which produce them using an algorithm for dynamic time matching (Dynamic Time Warping) using relative frequencies for the allocations (see, page 369, lines 3-9 and FIG. 1).

Further, Besling determines the phoneme sequence  $p[1]...p[m]$  that is the most likely transcription of a word  $w=g[1]...g[n]$  that maximizes the conditional probability  $\Pr(p[1]...p[m] | g[1]...g[n])$ . Then, by rewriting this equation using the Bayes' formula, the equation (1) on page 369 of Besling, which second factor is the conditional probability  $\Pr(g[1]...g[n] | p[1]...p[m])$ , is obtained and a conditional probability is computed in a text passage (see, page 370, paragraph 5). Thus, the conditional probability  $\Pr(g[1]...g[n] | p[1]...p[m])$  of Besling is an indirect way of determining a searched conditional probability  $\Pr(p[1]...p[m] | g[1]...g[n])$ . This is unlike the position-dependent probability of the present invention that is used in a direct way to determine the searched conditional probability  $\Pr(p[1]...p[m] | g[1]...g[n])$ .

On pages 2 and 3 of the Office Action (paragraph 2), the Examiner indicates that the probability (frequency) of a grapheme  $g[i]$  is dependent on the preceding graphemes, the previous phonemes and the current phoneme, which is in mathematical terms  $\Pr(g[i] | g[i-1]; p[i-2], p[i-1], p[i])$ . However, the position-dependent frequency of the present invention is a frequency with which the grapheme  $g[i]$  at a specific position within a grapheme group is assigned to a phoneme  $p$ , which is in mathematical terms  $\Pr(g[i] \rightarrow p | \langle g[1], ..., g[i], ..., g[k] \rangle)$  (see, page 7, paragraphs 31 and 32). Thus, it is not the conditional probability of a grapheme being assigned to a phoneme, but the conditional probability of a grapheme. Further, the conditional argument is not the position within a grapheme group, but only the preceding graphemes of the respective grapheme.

As recited in amended independent claims 1 and 12, the assignment of graphemes to phonemes within a word is corrected with aid of "position-dependent relative frequencies including a frequency with which at least one grapheme at a specific position within a grapheme group is assigned to at least one phoneme".

Besling does not teach or suggest, assigning phonemes to a lexicon of words where "the assignment of graphemes to phonemes within a word is corrected with aid of position-dependent relative frequencies including a frequency with which at least one grapheme at a specific position within a grapheme group is assigned to at least one phoneme".

It is therefore respectfully submitted that the independent claims 1 and 12 are patentable over Besling.

For at least the above-mentioned reasons, claims depending from independent claims 1 and 12 are patentably distinguishable over Besling. The dependent claims are also independently patentable. For example, as recited in claim 4, "after execution of the assignment of graphemes to phonemes for each word of the lexicon, these assignments are used to determine the position-dependent relative frequency...", where "assignment of graphemes to phonemes within a word is corrected with aid of position-dependent relative frequencies including a frequency with which at least one grapheme at a specific position within a grapheme group is assigned to at least one phoneme" (claim 1 upon which claim 4 depends).

Therefore, withdrawal of the rejection is respectfully requested.

**REJECTION UNDER 35 U.S.C. § 103(a):**

Claims 2, 3, 6, 8-11 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Besling in view of Dynamic Programming Algorithm Optimization for Spoken Word Recognition (Sakoe).

The Examiner relies on Sakoe as teaching details of the dynamic time warping algorithm used to align the phonemes to the graphemes. However, Sakoe is directed to eliminating timing differences between two speech patterns by warping the time axis of one so that the maximum coincidence is attained with the other (see, page 43, section I).

Independent claims 2 and 13 as amended recite that the present invention creates "a two-dimensional matrix (incidence matrix), one index of which is given by the grapheme of the word, and the second index of which is given by the phoneme of the word" and uses matrix elements to define the assignment of graphemes to phonemes of the word, where the

assignment of graphemes to phonemes within a word are corrected using position-dependent relative frequencies including "a frequency with which at least one grapheme at a specific position within a grapheme group is assigned to at least one phoneme".

The combination of the Besling and Sakoe does not teach or suggest assigning phonemes to the graphemes in a lexicon having grapheme sequences and associated phoneme sequences including creating "a two-dimensional matrix (incidence matrix), one index of which is given by the grapheme of the word, and the second index of which is given by the phoneme of the word uses matrix elements to define the assignment of graphemes to phonemes of the word" and correcting the assignment of graphemes to phonemes within a word using position-dependent relative frequencies including "a frequency with which at least one grapheme at a specific position within a grapheme group is assigned to at least one phoneme", as recited in independent claims 2 and 13.

For at least the above-mentioned reasons, dependent claims 3, 6, and 8-11 are also patentably distinguishable over the combination of Besling and Sakoe.

Therefore, withdrawal of the rejection is respectfully requested.

**CONCLUSION:**

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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